

Ecosystem Services Provided by Mauka Lands

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| Ecosystem Services | From the Literature |
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| Provisioning Services | |
| Sufficient access to food | |
| Fuel | |
| Genetic resources | |
| Biochemicals/Pharmaceuticals discoveries | |
| Ornamental resources | |
| Freshwater | |
| Regulating Services | |
| Air quality regulation | |
| Climate regulation | <ul style="list-style-type: none"> • By researching rates of land-use change and changes per hectare in carbon that follow a change in land use it was determined that during the 1980's the net flux of carbon attributable to land management offset 10-30% of U.S. fossil fuel emissions (Houghton et al. 1999). • Deforestation has decreased global vapor flows from land by 4%. Therefore, deforestation represents an equivalent force to irrigation in terms of changes in the hydrological cycle (Gordon et al. 2005). |
| Water regulation | <ul style="list-style-type: none"> • Ecosystem management decisions designed to provide specific ecosystem services such as carbon sequestration may lead to the degradation of other services. For example although plantations are extremely efficient sinks for carbon and can help control groundwater recharge and upwelling they may reduce stream flow and salinize and/or acidify some soils. Plantations typically place greater demands on water and nutrient resources than grasslands, shrublands or even croplands (Jackson et al. 2005). • In areas marked by water scarcity the economic cost of an invasive species which consumes large amounts of water can be immense. Recovery of these costs can be accomplished through the eradication of the species and the consequential return of services provided by the water (Zavaleta 2000). • Researchers at the University of Hawai'i have studied the Ko'olau Mountain forests, O'ahu's primary source of water, and concluded that if there were complete deforestation the value of the lost recharge to the islands aquifers would be between \$4.6 and \$8.5 billion. When other services such as aesthetic value, climate control, and biodiversity were included in the valuation the total value of the watershed was estimated at between \$7.4 and \$14 billion (Kaiser and Roumasset 2002). • Forest ecosystems in the watersheds of Yangtze River (Tibetan |

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| | Plateau) regulate water flow in the rivers. As a result, hydroelectric power plants in the region are able to increase electricity production. The value of the forest for water regulation is therefore greater than the lumber value of the forest (Guo et al. 2000). |
| Erosion control | |
| Water purification | <ul style="list-style-type: none"> • A study of 16 streams in eastern North America found that riparian deforestation causes channel narrowing which in turn reduces the amount of stream habitat in ecosystems thereby compromising in-stream processing of pollutants. Forest buffers not only prevent non-point source pollutants from entering small streams, but also encourage the in-stream processing of both non-point and point source pollutants; reducing their impact on downstream rivers and estuaries (Sweeney et al. 2004). |
| Disease control: Human | |
| Disease control: Pests | |
| Pollination | <ul style="list-style-type: none"> • Conserving forest fragments within agricultural landscapes may increase both yield and quality of produce by providing habitat for essential pollinators. For example researchers in Costa Rica found that forest based pollinators increased coffee yields by 20% in plants located within 1 km of forest (Rickets 2004). |
| Storm Protection | |
| Cultural Services | |
| Spiritual/religious values | |
| Aesthetic values | |
| Recreation and ecotourism | <ul style="list-style-type: none"> • Hawaii's coastal reefs generate almost \$364 million each year in added value and about 84% of this value is generated from snorkeling and diving activities around the islands (Davidson 2003). |
| Cultural diversity | |
| Knowledge systems (diversity & memory) | |
| Human Well-Being | |
| Material well-being | |
| Health | <ul style="list-style-type: none"> • Internal urban ecosystems such as parks and lakes produce a wide variety of ecosystem services, which have a substantial impact on the quality of life in urban areas (Bolund and Hunhammar 1999). |
| Security | |
| Social Relations | |
| Freedom and Choice | |